NBL-WQ-BGA-408-S Online Blue Green Algae Sensor

User Manual

Changsha Zoko Link Technology Co., Ltd.

Tel:+8615367865107

E-mail：sales@niubol.com

Website：www.niubol.com

Address: Room 102, District D, Houhu Industrial Park, Yuelu District, Changsha City, Hunan Province, China

User Notes

- Please read the instructions carefully before using and save it for reference.
- Please follow the instructions and precautions.
- When receiving the instrument, please open the packaging carefully, inspect equipment's damage level in case of transportation, if you found spoiled equipment, please immediately notify the manufacturer and distributor, and retain the packaging, in order to send back to processing.
- When the instrument is in trouble, please don't repair it by yourself, please directly contact the maintenance department of the manufacturer.

Content

Ⅰ、Working principle

The blue-green algae sensor utilizes the characteristic that the cyanobacteria has in terms of an absorption peak and an emission peak in the spectrum. The spectral absorption peak of the cyanobacteria emits monochromatic light to the water, and the cyanobacteria in the water absorbs the energy of the monochromatic light, releasing another wavelength. The light intensity emitted by cyanobacteria is proportional to the content of cyanobacteria in the water.

- Monitoring the concentration of microalgae in the ocean harbor
- Monitoring green algae and cyanobacteria such as rivers and lakes
- Monitoring marine algae red algae *Monitoring red algae in mariculture*
- Determination of green algae concentration in the treatment of green algae cultivation equipment
- Support RS-485 (Modbus/RTU protocol)
- Convenient, fast, stable and easy to maintain

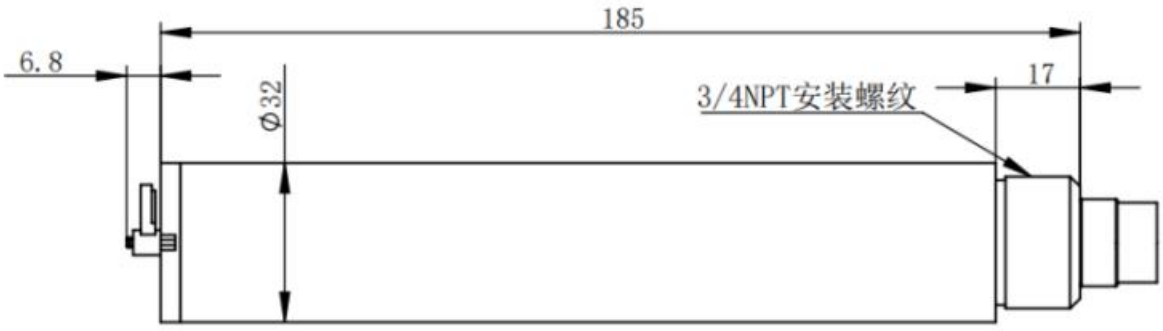
Ⅱ、Technical performance and specifications

1. Technical parameters

Model	NBL-WQ-BGA-408-S
Measuring range	0～300.0Kcells/mL
Resolution	0.1Kcells/mL
Accuracy	±3%，±0.3℃
Calibration	Two-point calibration
Protection grade	IP68
Deepest depth	0～50℃，＜0.2MPa
Storage temperature	-5～65℃
Signal output	RS-485(Modbus/RTU) 、4-20mA(Optional)
Power supply	12～24VDC
Power	0.2W@12V
Cable length	5 meters, can be customized
Shell material	ABS and 316L stainless steel
Conditional requirements	The distribution of blue-green algae in water is uneven, and it is recommended to monitor more;

	The water turbidity is less than 50 NTU.

2. Dimension



Note: the sensor joint is M16-5 waterproof joint

Ⅲ、Installation and electrical connection

1. Installation

Installation distance requirement: keep more than 5cm with the side wall and 20cm or more with the bottom.

2. Electrical connection

The cable is 5-core twisted pair shielded wire, the wire sequence definition:

- Red cord—power cord（12V～24VDC）
- Black cord —ground cord（GND）
- Blue cord—485A
- Green cord—485B
- Yellow cord—Current output (if unused, suspended)

The wiring sequence should be carefully checked before power-on to avoid unnecessary losses caused by faulty wiring.

Wiring instructions: considering the cable long-term Immersion in water (including sea water) or exposure to air, all wiring are required to do waterproof treatment, the user cable should have a certain degree of corrosion resistance.

Ⅳ、Maintenance

1. Maintenance procedures and methods

1.1 Maintenance schedule

The cleanliness of the measurement window is very important to maintain accurate readings.

Maintenance task	Recommended maintenance frequency
Calibrate the sensor (if required by the competent authority)	According to the maintenance schedule required by the competent authority

1.2 Maintenance methods

- Sensor outer surface: Clean the outer surface of the sensor with tap water. If there is still debris left, wipe it with a soft, damp cloth. For some stubborn dirt, add some household washing liquid to the tap water to clean it.
- Check the cable of the sensor: the cable should not be tightened during normal operation. Otherwise, the internal cable of the cable may be broken and the sensor may not work normally.
- Check whether the sensor's measurement window is dirty or not.

1.3 Cautions

The probe contains sensitive optical and electronic components. Make sure the probe is not subject to severe mechanical shock. There are no parts inside the probe that require user maintenance.

2. Sensor calibration

a) Zero calibration: Take a proper amount of distilled water in a large bucket and place the sensor vertically in the solution. The front end of the sensor is at least 20 cm away from the bottom of the beaker. After 3 to 5 minutes, the value is stabilized and the zero point is calibrated. The instructions refer to the appendix.

b) Slope calibration: Place the sensor probe in the standard solution. The front end of the sensor is at least 20cm away from the bottom of the beaker. After 3 to 5 minutes, the slope is calibrated after the value is stable. The instructions refer to the appendix.

3. Frequently asked questions

Error	Possible reason	Solution
The operation interface cannot be connected or the measurement result is not	The measured value is too high, too low or the value is continuously unstable	Reconnect controller and cable

displayed.	Cable failure	Please contact us
The measured value is too high, too low or the value is continuously unstable	The sensor window is attached by a foreign object	Cleaning the sensor window surface

Ⅴ、Quality and service

1. Quality assurance

- The quality inspection department has standardized inspection procedures, advanced and perfect testing equipment and means, and strictly in accordance with the regulations, to do a 72-hour aging test and stability test on the product, and not to allow one unqualified product to leave the factory.
- The receiving party directly returns the product batch with a failure rate of 2%, and all the costs incurred are borne by the supplier. The reference standard refers to the product description provided by the supplier.
- Guarantee the quantity of goods and the speed of shipment.

2. Accessories spare and parts

This product includes:

- 1 sensor
- 1 copy of the manual
- 1 certificate
- 1 Cable (5 m)

3. After-sales service commitment

The company provides local after-sales service within one year from the date of sale, but does not include damage caused by improper use. If repair or adjustment is required, please return it, but the shipping cost must be conceited. If damaged on the way, the company will repair the damage of the instrument for free.

Appendix data communication

1. Data format

The default data format for Modbus communication is: 9600, n, 8, 1 (baud rate 9600bps, 1 start bit, 8 data bits, no parity, 1 stop bit).

2. Information frame format

a) read data instruction frame

0C	03	xx xx	xx xx	xx xx
Address	Function code	Register address	Number of registers	CRC check code (low byte first)

b) read data response frame

0C	03	xx	xx.....xx	xx xx
Address	Function code	Bytes	Answer data	CRC check code (low byte first)

c) write data instruction frame

0C	06	xx xx	xx xx	xx xx
Address	Function code	Register address	Write data	CRC check code(low byte first)

d) Write data response frame (same data command frame)

0C	06	xx xx	xx xx	xx xx
Address	Function code	Register address	Write data	CRC check code (low byte first)

3. Register address

Register address	Name	Instruction	Number of registers	Access method
40001 (0x0000)	Value	Two double-byte integers, which are measured values and measured decimal places.	2（4 bytes）	Read
44097 (0x1000)	Zero calibration	Calibrated in distillation, the write data is 0; the read data is zero offset. (It can also be calibrated in a standard solution of 0-100 Kcells/mL. The calibration method is based on the slope calibration)	1（2 bytes）	Write

44101 (0x1004)	Slope calibration (9.18PH)	Calibrate in the known standard solution (100 Kcells/mL -- 300 Kcells/mL), and write the data as the actual value of the standard solution ×10;The read data is the slope value ×1000.	1（2 bytes）	Write
48195 (0x2002)	Device address	Default address is 12, data range is 1-255.	1（2 bytes）	Write/ Read
48225 (0x2020)	factory reset	Restore calibration values to factory settings, write data to 0.	1（2 bytes）	Write

4. Command example

a) Start measurement command

Function: Get the blue-green algae value measured by the sensor; the unit of blue-green algae is Kcells/mL.

Request frame: 0C 03 00 00 00 02 C5 16

Response frame: 0C 03 04 01 02 00 01 47 0F

Reading example:

blue-green algae value
01 02 00 01

For example: blue-green algae value 01 02 represents the blue-green algae value in hexadecimal reading, 00 01 represents the blue-green algae value with 1 decimal point, and the converted decimal value is 25.8.

b) Calibration instructions

Zero point calibration

Function: Set the blue-green algae zero-point calibration value of the sensor; here the zero-point calibration is performed in distilled water;

Request frame: 0C 06 10 00 00 00 8C 17

Response frame: 0C 06 10 00 00 00 8C 17

slope calibration

Function: Set the blue-green algae slope calibration value of the sensor; the slope value here is based on the actual standard solution value × 10. Take 300Kcells/mL as an example to refer to the calibration;

Request frame: 0C 06 10 04 0B B8 CA 94

Response frame: 0C 06 10 04 0B B8 CA 94

c) Set device ID address:

Function: Set the Modbus device address of the sensor;
Change the sensor address 12 to 01, the example is as follows
Request frame: 0C 06 20 02 00 01 E3 17
Response frame: 0C 06 20 02 00 01 E3 17

5. Error respond

If the sensor does not correctly execute the host command, it will return the following format information:

Definition	Address	Function code	Code	CRC check
Data	ADDR	COM+80H	xx	CRC 16
Number of bytes	1	1	1	2

a) CODE: 01 –Function code error
03 – Data is wrong
a) COM: The received function code